

# Product Information

## Hasulith Cold Enamel (Resin C/Hardener V20L)

Article: 2ASLFL

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### SPECIFICATION/CHARACTERISTICS

**HASULITH® Cold Enamel** (Resin C + Hardener V 20 L) is a 2-Component Epoxy-System to obtain an effect like glass-enamel e.g. on (fashion) – jewelry, badges, pins or orders.

The colourless Cold Enamel can be used e.g. for coating photos, printed labels or as a decorative protection coating for e.g. badges or orders whose deepening have been painted with coloured lacquers before.

To obtain coloured Cold Enamel the colourless Cold Enamel can be mixed with Colour-Pastes (for opaque, hiding colours) or with HASULITH® Dyestuff-Concentrates (for transparent coloured effects).

Other characteristics of **HASULITH® Cold Enamel** are:

- good scratch resistance
- drying on ambient temperature (no oven necessary)
- almost no colour of its own and
- very minimal yellowing on exposure to light or on aging
- resistant against many chemical influences

After the Cold Enamel is dry it can be drilled, filed or polished.

### RECOMMENDED MATERIALS

In most cases Cold Enamel is applied on metals. Other suitable materials are: glass, ceramics, china and some hard plastics like Plexi, PS, ABS.

Not appropriate for plastics like PVC, PET, PE, PP, rubber, Nylon and other elastic or flexible materials. Also not recommended for the application on absorptive materials like e.g. cardboard, wood, fabrics etc.

### DIRECTIONS FOR USE - GENERAL

The areas to be coated have to be dry and clean - free from dust, grease, oil, lubricants and other adherents.

By reason of the low viscosity of Cold Enamel it is very suitable for the application on flat surfaces or for filling into deepening - but not suitable for the application on curved or inclined surfaces (will flow away during the drying time). Also not suitable for repairs on damaged glass-enamel.

As already mentioned, colourless Cold Enamel also can be used for coating photos or printed labels. On „genuine“ photos no problems have been reported yet, but on printed photos or labels discolour or bleeding effects can occur (although seldom). Because of the big variety of materials used on this field (e.g. printing inks, toners, paper qualities...) sufficient trials and tests have to be made, to make sure that no undesired effects will occur on contact with the Cold Enamel. Sometimes this effects can occur even after the Cold Enamel looks already dry - so it is recommended to watch the result for some time.

Accordingly tests are recommended as well, if coloured painted areas are overcoated with colourless Cold Enamel.

If colourless Cold Enamel is used for coating areas which have been painted with our glossy, opaque, coloured **HASULITH -Tn-Lacquers**, the Tn-Lacquers have to be completely dry first - otherwise some discolour of the Tn-Lacquers can be observed (e.g. white will discolour a little bit to creamy-white - but still to an acceptable extent).

Because of the good adhesion properties to many hard materials **HASULITH® Cold Enamel** can also be used as a transparent and colourless two-component adhesive e.g. for gluing big stones. For details about this kind of application: see product information **HASULITH® Duo**.

### PREPARATION OF COLOURLESS COLD ENAMEL

#### Mixing:

Resin C and Hardener V20L have to be mixed in a ratio of **10:4** (e.g. 10 g Resin C + 4 g Hardener V20 L) until the mixture is completely homogeneous.

The mixing ratio must be observed as accurate as possible to obtain optimal results. The tolerance of the mixing ratio is in a range of **10 : 4** until **10 : 4.5** this means 10 g Resin C must be mixed with 4 g (minimum) to 4.5 g (maximum) of Hardener V 20 L.

Please notice: excess of hardener will not lead to shorter drying time or higher hardness. If too much hardener was used, the Cold Enamel will get a dull and greasy looking surface mixture will remain soft and sticky.

For measuring of the compounds we recommend to use scales with appropriate precision. In electronic shops you can buy electronic pocket scales e.g. with a precision of 0.1 g and a maximum load of about 200 g. This kind of scales are very suitable especially for the preparation of small amounts of Cold Enamel mixtures.

As a makeshift or for first trials the measuring also can be done by using one-way syringes (e.g. a 10 ml syringe for Resin C and a not completely filled 5 ml syringe for Hardener V 20 L).

This method is not very precise and it has to be sure that the compounds do not include air bubbles which can falsify the result.

Suitable mixing receptacles can be clean plastic cups e.g. film cups or other small containers made of non absorbent materials. Absorbent materials (like e.g. paper or cardboard cups, wooden boards etc.) are not suitable.

For mixing a metal spatula (e.g. our Art.No.8 DSP-ST spatula, stainless steel, 185x9 mm) or a glass rod proved to be very suitable. If always cleaned after mixing they can be used for many years.

#### pot life of the mixture:

The pot life of the mixture is about 30-35 min. at ambient temperature. Towards the end of the pot life, the mixture will become thicker and starts to form threads. At that time the mixture should not be used anymore because the adhesion to the surface of the object to be coated will become worse. Soon after the first appearance of the forming of threads the mixture will get warm and solid.

For the limited pot life only an amount should be mixed which can be worked up within 30 minutes.

#### application of the Cold Enamel mixture:

For coating areas of several square centimeters the Cold Enamel mixture can be cast on the object or into the cavities and spread to the borders, edges or corners using a spatula or a small wooden stick.

In case the Cold Enamel has to be applied to smaller or even very small areas of a few square millimeters, usually the mixture is transferred to a syringe with a needle and applied through that.

Syringe and needle have to be cleaned with an appropriate thinner (e.g. our Thinner 1002 or 1000) before end of potlife or have to be thrown away after use (because of the low prices for syringes and needles (20-55 ct.) cleaning is not worth the effort in most cases).

Syringes in sizes of 5 ml, 10 ml or 20 ml resp. needles with diameters of 0.8 mm or 1.2 mm can be supplied by us. The needles (supplied length = 4 cm) have to be cut to a length of about 1 cm for more convenient working.

For removing air bubbles from the Cold Enamel coating the best method is to fan cautiously over the coating with the (blue) flame of a soldering-lamp in a distance of at least 20-30 cm (but take care not to burn the Cold Enamel).

# Product Information- Appendix

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### PREPARATION OF COLOURED COLD ENAMEL

#### a) Opaque coloured Cold Enamel

can be obtained by mixing colour-pastes (or pigment powder) into the colourless Cold Enamel. Usually an amount of 2-6 % of colour paste (parts by weight calculated on colourless mixture) is enough to get a good hiding power.

Example: 10 g Resin C + 4 g Hardener V 20 L are mixed thoroughly, then 0.3 g (2%) of colour paste No.1010 black is added and mixed again.

It is also possible to prepare a stock of coloured resin compound by stirring the colour paste into the Resin C first and then use up the coloured resin by mixing with Hardener V 20 L in smaller portions. In case considerable amounts of colour paste have been added the mixing ratio of 10 parts resin + 4 parts of hardener can change, because the colour pastes do not take part on the reaction.

Example: a stock of yellow Resin C was prepared by mixing 10 g colour paste No.528, yellow + 90 g Resin C. To obtain yellow Cold Enamel, 10 g of this coloured Resin C have to be mixed with 3.6 g of Hardener V 20 L (not 4 g like for the preparation of colourless Cold Enamel).

For mixed colours (e.g. green colour by mixing yellow and blue colour pastes) the colour pastes have to be mixed first to obtain the desired shade. Please notice that the colour of the paste mixture can change after stirred into the colourless Cold Enamel. Usually the shade will become a little bit darker.

Suggested formulations and other useful hints you will find in the appendix of this product information.

#### b) Transparent coloured Cold Enamel

can be obtained by mixing **Hasulith-Dyestuff-Concentrates** into the colourless Cold Enamel. In most cases an amount of 1-5 % of Dyestuff-Concentrate (parts by weight calculated on colourless mixture) is enough to get a deep transparent coloured shade. Please notice that -especially on the transparent colours- the shade will depend (considerable) on the amount of Dyestuff-Concentrate and the thickness of the transparent coloured Cold Enamel layer. To obtain reproducible results it is recommended to write down the amount of Dyestuff-Concentrate which was used resp. to prepare a stock of transparent coloured Resin C analogous like described under a).

If a Dyestuff-Concentrate is added to a colourless Cold Enamel mixture the shade can change a little bit until the Cold Enamel is completely dry. For this reason we recommend to make trials in a small range and see the final result after the transparent coloured Cold Enamel is dry first before a production is started.

Suggested formulations and other useful hints you will find in the appendix of this product information.

#### c) Coloured Cold Enamel with Pearlescent-Effect

Combinations of pearlescent pigments with Dyestuff-Concentrates in Cold Enamel will lead to interesting decorative effects. A typical mixture will consist of 5-10 % of pearlescent pigment + 5 % of Dyestuff-Concentrate (parts by weight calculated on colourless Resin C + Hardener V 20 L mixture). Because some pearlescent pigment will settle down during the hardening process, it is recommended to stir through (e.g. with a toothpick) the applied Cold Enamel coating after 1 h drying at ambient temperature to obtain decorative streaks in the coating.

Pearlescent pigments are available in: silver, yellow, red, green, violet, blue and copper-brown.

Example: To a mixture of 10 g Resin C + 4 g of Hardener V 20 L, 1 g of yellow pearlescent pigment 0.7 g of Dyestuff-Concentrate No.16, red is added and stirred in thoroughly. About one hour after application the Cold Enamel mixture will become thicker and has to be stirred through with a toothpick to obtain the decorative streaks.

### CURING PROCESS / DRYING

At ambient temperature the *colourless* Cold Enamel will become tack-free after about 6-8 hours. Full hardness will be achieved after 24 hours.

Adding Colour Pastes or Dyestuff-Concentrates will lead to some retardation of the drying time - depending on the amount - which was added. Especially the final hardness will be reached later.

Although seldom practised drying can be accelerated by higher temperatures.

Drying Temperature	Drying time
at 20°C	24 hours
at 60°C	2-3 hours
at 80°C	30 min.

To avoid disturbances on the surface of the Cold Enamel we recommend to let the coating get dry at ambient temperature first (at least for half day better: over night) before the objects are put to an oven to complete the drying process.

Please notice that the pre-dried coating can get liquid again for a while after put to an oven (especially if put too early). If you dry the coatings in an oven it must be sure that the Cold Enamel mixture can not flow away during the drying time.

### REMOVING OF COLD ENAMEL

Because of the very good resistance properties of **HASULITH® Cold Enamel**, removing of the hardened Cold Enamel is almost impossible (especially if the drying was finished by using higher temperatures or the Cold Enamel is dry already for a longer time).

If the coated materials can stand for higher temperatures (e.g. metals, glass) the coating can be removed mechanically after heating to temperatures of at least 150°C.

Long term soaking (at least one day) in our **Solvent NMP (Art.-No. 5NMP)** also can help in some cases. The Cold Enamel will not be dissolved but will swell, so there is some chance to peel it off cautiously e.g. using a knife or a spatula.

Both methods are not appropriate if the coated objects also contain plastics parts or other sensitive materials. Lacquer coatings on the glued object also will be affected or removed.

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### SAFETY

#### Resin C



Dangerous for environment



Irritant

Resin C; R 36/38-43-51/53; S 24/25-26-28-37/39-61

Irritant to eyes and skin. Sensitization by skin contact possible. Toxic for aquatic organisms.

#### Hardener V 20 L



Corrosive

Hardener V 20 L; R 20/21/22-34-42/43; S 2-9-20-24/25-26-28-36/37/39-45-61

Harmful on inhalation, contact with skin and if swallowed. Can cause burns. Sensitization by inhalation and skin contact possible.

Resin C and Hardener V20L: Keep out of reach of children. Do not eat, drink or smoke when working with the material. Avoid contact with eyes or skin. After contact with skin: rinse with plenty of soap water. After eye contact: rinse with plenty of water and see an oculist immediately. If swallowed or in case of accident: seek for medical advice immediately. Wear gloves and goggles. Do not release to the environment.

### STORAGE/HANDLING

#### Resin C:

Should be stored at ambient temperature in a well closed container in a dry and dark place. Under this conditions it can be stored at least for one year.

#### Hardener V 20 L:

Should be stored in a well closed container in a cool, dry and dark place. Under this conditions it can be stored at least for 6 month. If stored in a refrigerator (away from foodstuffs or beverages !) it can be stored at least for one year. In this case the hardener has to be put out of the refrigerator several hours before use to get ambient temperature.

Long term exposure to light and frequent exposure to oxygen can cause some yellowing. This will not affect the mechanical properties but will lead to a slightly yellow Cold Enamel.

**Hardener V 20 L** will slowly absorb some carbon dioxide from the air by forming insoluble salt crusts. For this reason the containers should be always closed after use.

### WASTE

Completely hardened mixtures can be wasted together with the household rubbish. Residues of the single components or not completely emptied containers have to be wasted as hazardous waste according to the local regulations.

### AVAILABLE CONTAINERS

#### 2-Component Set (Resin C + Hardener V 20 L)

1HDCV20L-KS	Small set	100 g Resin / 40 g Hardener
-MIDS	Midi set	500 g Resin / 200 g Hardener
-MS	Medium set	1000 g Resin/ 400g Hardener
-GS	Big set	8 kg Resin / 4 kg Hardener

#### Resin C in single container

1HC-010	bottle	100 g Resin C
-1	bottle	1000 g Resin C
-10	canister	8 kg Resin C

#### Hardener in single container

1HV20L-005	bottle	40 g Hardener V20L
-050	bottle	400 g Hardener V20L
-5	canister	4 kg Hardener V20L

Other units or bulk quantities on request. For resellers we can supply our **HASULITH® Cold Enamel** in containers without label or we can label and pack them according to customers demand.

# Product Information- Appendix

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### APPENDIX: SUGGESTED FORMULATIONS FOR THE PREPARATION OF COLOURED COLD ENAMEL

#### General:

Some first information about the preparation of coloured Cold Enamel has been given already on the previous pages. Some extended information you will find in this „appendix“.

The suggested amounts given in per cent (%) have to be considered as „per cent - by weight“ and refer to the amount of colourless Cold Enamel *mixture* - not to a single compound.

**Example:** „2 % Dyestuff-Concentrate“ means:  
10 g Resin C + 4 g Hardener V 20 L + 0.3 g Dyestuff-Concentrate  
(14 g of mixture + 2% [= 0.28 g] of Dyestuff-Concentrate).

The recommended amounts of Colour Pastes or Dyestuff-Concentrates have proved to lead to optimal results but should be regarded as „suggestions“ resp. „a rule of thumb“. In a particular cases it might be recommended or even necessary to take higher or lower amounts.

As already mentioned, the addition of Colour Pastes or Dyestuff-Concentrates to the colourless Cold Enamel will lead to some retardation of the drying time. The retardation of the drying time will depend on the amount of Colour Paste resp. Dyestuff-Concentrate so it is recommended to add only the necessary amount and to avoid excesses of this components to keep the drying time as short as possible.

#### Opaque coloured Cold Enamel:

Usually the following amounts of Colour Pastes are sufficient to obtain a good hiding power. (thickness of the coating: about 1 mm):

Black Colour Paste: 2 %  
White Colour Paste or mixtures with high white content: 4 %  
Yellow Colour Paste or mixtures with high yellow content (e.g. green): 5-6 %  
Red Colour Pastes: 2 %  
Blue Colour Paste mixtures: 3-4 %

**Colour Pastes:** (available in glass bottles of 25, 50, 100 or 250 ml)

- Colour Paste No.1004 white
- Colour Paste No.1010 black
- Colour Paste No.528 yellow
- Colour Paste No.1032 blue\*)
- Colour Paste No.662, light red („traffic sign red“)
- Colour Paste No.654, deep red („blood red“)
- Colour Paste No.661, dark red („bordeaux-red“)

\*) Our blue Colour Paste (No.1032) is a little bit transparent, very dark and will look almost black on small areas. For this reason this Colour Paste is always mixed with Colour Paste (No.1004), white to obtain better hiding power and more nice blue shades (see examples on this page).

#### Mixtures of Colour Pastes:

By mixing the above mentioned basic colours a big variety of shades can be prepared. Please notice that the Colour Paste mixtures will appear a little bit different after stirred into the colourless Cold Enamel: usually the shade will look darker compared with the paste mixture.

#### Blue Shades:

By mixing **8 g Colour Paste blue** (No.1032) with **2 g Colour Paste white** (No.1004) a dark blue shade („royal blue“) will be obtained. For lighter blue shades the amount of white has to be increased e.g. 8 g of white + 2 g of blue will lead to a medium to light blue shade.

#### Green Shades:

For mixing green shades, plenty of yellow paste and only a little bit of blue paste is used.

By mixing **19 g Colour Paste yellow** (No.528) with **1 g Colour Paste blue** (No.1032) a deep green shade („fir-needle green“) will be obtained. For lighter green shades it is recommended to prepare this dark green mixture first and using small amounts of it to mix with yellow paste again.

#### Brown Shades:

By mixing **15 g Colour Paste yellow** (No.528) with **4 g Colour Paste red** (No.662) and **1 g Colour Paste black** (No.1010) a dark brown shade („chocolate brown“) will be obtained. Higher amounts of yellow paste will make the shade lighter, higher amounts of black paste will make it darker.

#### Transparent coloured Cold Enamel:

The intensity of the transparent colour depends very much on the amount of Dyestuff-Concentrate added to the colourless Cold Enamel. Also on the thickness of the coating. The amounts in the following table will lead to a deep transparent coloured shade (on a thickness of about 1 mm):

Dyestuff-Conc. No.:	Name	amount in % (by weight)	light-fastness
4	Zaponechtgelb R	5%	+++
6	Astravesuvin B	7%	++
7	Astravesuvin R	5%	++
9	Zaponechtorange RR	4%	+++
10	Astrachrysiodin RR	5%	+++ / ++
11	Zaponechtrot CG	7%	++
12	Brilliantfeuerrot WL	3%	++
13	Zaponechtrot HCB	7%	+
15	Zaponechtfeuerrot B	4%	+++ / ++
16	Zaponechtrot BE	1%	+++
17	Savinylrosa	1%	+++
18	Zaponechtviolett RR	2%	++
20	Zaponechtblau FLE	1%	+++
24	Zaponechtgrün GG	2%	+
30	Brilliantsspritschwarz TN	4%	++
31	Savinylbraun GLS	2%	+++
32	Savinylblau RS	4%	++

+++ = good ++ = medium + = bad

For long-life resp. valuable objects only Dyestuff-Concentrates with good light fastness are recommended.

**Tip:** Using very slight amounts of some Colour Pastes also can lead to transparent or translucent effects.

#### Example:

By adding **one drop (!) of Colourpaste blue** (No.1032) to a mixture of **10 g Resin C + 4 g Hardener V 20 L** a transparent blue Cold Enamel will be obtained. The colour is similar like the one obtained by adding 4 % of Dyestuff-Concentrate No.32 but with much better light fastness. So for long life resp. high quality products it's better to prepare a transparent blue Cold Enamel using paste No.1032 instead of Dyestuff Concentrate No.32.

Green shades with good light fastness can be obtained by adding **Dyestuff Conc.No.4** to the above mentioned transparent blue coloured mixture or -more easy- by mixing e.g. 9 g Dyestuff-Conc.No.4 with 1 g Dyestuff-Conc.No.20 and adding about 3-5 % of this mixture to the colourless Cold Enamel mixture.